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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/667,297	09/22/2000	Eric R. Lovegren	R11.12-0701	1706

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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/667,297	LOVEGREN ET AL.	
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-20,25,31,34,37,39 and 43-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-20,25,31,34,37,39 and 43-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 17-19 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,626,038 to Carsella et al. (incorporating by reference U.S. Patent No. 5,609,059 to McEwan) in view of U.S. Patent No. 5,134,377 to Reddy, III et al.

MPEP §2163.07(b) [R-3]: Incorporation by Reference: Instead of repeating some information contained in another document, an application may attempt to

incorporate the content of another document or part thereof by reference to the document in the text of the specification. The information incorporated is as much a part of the application as filed as if the text was repeated in the application, and should be treated as part of the text of the application as filed.

Carsella discloses a radar level transmitter for providing level detection of materials in a container (Carsella; column 2, lines 48-57), the transmitter comprising an antenna (McEwan; column 6, lines 12-16), a transceiver coupled to the antenna (McEwan; column 6, lines 12-16) and configured to transmit a microwave (i.e., 200ps = 5 GHz) (McEwan; column 8, lines 40-41) pulse having a transmit pulse amplitude using the antenna and produce a signal representing reflected wave pulses (McEwan; column 6, lines 22-25), a microprocessor system coupled to the transceiver and adapted to control the transceiver and process the signal (McEwan; column 6, lines 57-59 and column 9, lines 45-47), and a level calculation module executable by the microprocessor system and adapted to establish a level in the container of a first material interface using the signal and a threshold (McEwan; column 8, line 66 to column 9, line 3 and column 9, lines 32-47).

Carsella also discloses that a fiducial interface is formed between an antenna (McEwan; column 6, lines 12-14) and the first material and the method including detecting a fiducial pulse, using a corresponding fiducial threshold, corresponding to a portion of the transmitted microwave pulse reflected from the fiducial interface (McEwan; column 6, lines 43-53) which is used in combination with the first

threshold value to determine the level in the container (McEwan; column 8, line 66 to column 9, line 3 and column 9, lines 32-47).

Carsella also discloses the microprocessor is adapted to receive, from an operator, information related to properties of the materials (i.e. dielectrics) (Carsella; column 5, lines 30-37) and that the amplitude of the reflected pulses are corrected by gain based on the properties of the materials (Carsella; column 4, lines 43-48).

Carsella discloses that the information related to properties of the materials comprises dielectric parameters having a value corresponding to a dielectric of a first material adjacent to the antenna and a second dielectric parameter having a value corresponding to a dielectric of a second material located below the first material (Carsella; column 1, lines 25-34 and column 8, lines 1-5).

Carsella discloses including an input/output port adapted to transmit a level output that is indicative of the first material interface (McEwan; column 9, lines 32-47).

Carsella further discloses that a first material interface is formed between first and second materials (McEwan; column 6, lines 16-18).

Carsella also discloses a second material interface located between second and third materials, the third material below the second material, and the method including detecting a second reflected wave pulse corresponding to a portion of the transmitted microwave pulse reflected from the second material interface (McEwan; column 6, lines 60-67 and column 7, lines 62-65).

As noted above, the invention of Carsella teaches many of the features of the claimed invention and while Carsella does teach including detection thresholds for detecting reflections at the first, second, and fiducial interfaces (McEwan; column 8, line 66 to column 9, line 3), Carsella does not specifically include the means for setting the detection thresholds.

Reddy discloses a method for use by a level transmitter to detect a reflected pulse of a transmitted pulse (column 1, lines 45-54) from a first material interface (column 3, lines 52-56), the method comprising calculating estimated reflection pulses as a function of a reference amplitude of the transmitted microwave pulse and the amplitude of the reflected pulse amplitude and setting a corresponding threshold values based on the estimated reflected pulse amplitude (column 1, line 64 to column 2, line 2 and column 9, lines 6-20) and detecting the reflected pulse from the first material interface using the threshold (column 1, lines 51-54), wherein the threshold calculation is performed using a microprocessor system (column 3, line 66 to column 4, line 6, column 5, lines 21-23, and column 9, lines 6-20).

It would have been obvious to one having ordinary skill in the art to modify the invention of Carsella to specify include the means for setting the detection thresholds, as taught by Reddy, because the combination would have provided an improved means for setting the thresholds of Carsella that, as suggested by Reddy, would have provided proper pulse detection without the detection of extraneous noise by employing a threshold specifically adapted to the particular conditions being

measured (column 1, line 64 to column 2, line 2 and column 8, line 63 to column 9, line 5).

Further since the invention of Carsella discloses that the microprocessor is adapted to receive, from an operator, information related to properties of the materials (i.e. dielectrics) (Carsella; column 5, lines 30-37) and that the amplitude of the reflected pulses are corrected by gain based on the properties of the materials (Carsella; column 4, lines 43-48) with the information related to properties of the materials comprising dielectric parameters having a value corresponding to a dielectric of a first material adjacent to the antenna and a second dielectric parameter having a value corresponding to a dielectric of a second material located below the first material (Carsella; column 1, lines 25-34 and column 8, lines 1-5) and the invention of Reddy teaches calculating a threshold as a function of a reference amplitude of the transmitted microwave pulse and the amplitude of the reflected pulse (column 1, line 64 to column 2, line 2 and column 9, lines 6-20), the combination would have calculated the threshold as a function of the transmit pulse amplitude and the information related to the properties of the materials.

Further still, since the invention of Carsella specifically discloses employing thresholds for detecting reflections at the first, second, and fiducial interfaces (McEwan; column 8, line 66 to column 9, line 3) and Reddy suggests employing thresholds specifically adapted to the particular conditions being measured, the combination would have employed a specific threshold for detecting each of the reflections at the first, second, and fiducial interfaces.

4. Claims 25, 31, 34, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carsella in view of Reddy, III et al. and further in view of U.S. Patent No. 6,087,977 to Rost.

As noted above, the invention of Carsella and Reddy teaches many of the features of the claimed invention and while the invention of Carsella and Reddy does teach preventing attenuation error in the reflected pulse measurement (McEwan; column 5, lines 15-21), the combination does not specifically teach calculating the estimated pulse/threshold value as a function of a correction/attenuation factor.

Rost teaches false alarm rate and detection probability in a receiver comprising a receiver for receiving radar signals (column 1, lines 11-21) using a threshold level that is calculated in accordance with a corrective attenuation factor (column 2, lines 51-58).

It would have been obvious to one having ordinary skill in the art to modify the invention of Carsella and Reddy to specifically include calculating the estimated pulse/threshold value as a function of a correction/attenuation factor, as taught by Rost, because, as suggested by Rost, the combination would have improved the probability of detecting the signals and increased the accuracy of the detection by accounting for degradations of the signal caused by reflections at a range far from the transceiver (column 2, lines 22-25 and column 6, lines 22-49).

5. Claims 20, 37, and 45 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Carsella in view of Reddy, III et al. and further in view of U.S. Patent No. 3,812,422 to De Carolis.

As noted above, the invention of Carsella and Reddy teaches many of the features of the claimed invention and while the invention of Carsella and Reddy teaches setting dielectric constants of the materials which are provided in order to determine material interface thresholds, the combination teaches inputting the dielectric constants by an operator rather than by a dielectric constant calculator.

De Carolis teaches an apparatus for measuring the levels of fluids and the dielectric constants of the same comprising a dielectric constant calculator (i.e. measuring instrument) (Figure 2) determining the dielectric constant of the second material (i.e. material other than air) as a ratio of the amplitude of the transmit pulse and the amplitude of the reflected pulse (column 1, lines 30-32 and column 5, lines 29-36).

It would have been obvious to one having ordinary skill in the art to modify the invention of Carsella and Reddy to include a dielectric constant calculator for calculating the dielectric constants of the materials, as taught by De Carolis, because the combination of Carsella and Reddy requires that the dielectric constants of the materials be set by a user and De Carolis suggests a combination that would have provided means for automatically determining the dielectric constants, thereby reducing the burden on the user (column 1, lines 30-32 and column 5, lines 29-36).

With respect to claims 37 and 45, since the invention of Carsella and Reddy determines the thresholds based on the dielectric constants of the fluids and further specifically indicates that the dielectric constant of the fluids vary with temperature (Carsella, column 5, lines 5-6) and the invention of De Carolis teaches a method for automatically determining the current dielectric constants of the fluids for determining the thresholds, it is considered inherent that the determined thresholds are also a function of temperature.

6. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carsella in view of Reddy, III et al. and further in view of U.S. Patent No. 5,672,975 to Kielb et al.

As noted above, the invention of Carsella and Reddy teaches many of the features of the claimed invention, and while the invention of Carsella and Reddy does teach the radar transmitter with a keypad for entering information related to properties of the materials received from an operator (i.e. dielectric constants) (Carsella; column 5, lines 30-37) connected as part of a process control loop (Carsella; column 3, lines 19-28) for connection to remote devices (Carsella; column 9, lines 8-11), the combination does not explicitly indicate that the information is received over the process control loop.

Kielb teaches a two-wire level transmitter for sensing the level of liquids in a tank (column 1, lines 40-58) connected over a process control loop (column 2, lines 10-

13) wherein commands are set to the transmitter from a control room over the process control loop (column 4, lines 49-58).

It would have been obvious to one having ordinary skill in the art to modify the invention of Carsella and Reddy to explicitly indicate that the information is received over the process control loop, as taught by Kielb, because the invention of Carsella and Reddy does implement a process control loop for remote communication and, as suggested by Kielb, the combination would have reduced the burden of the user by not requiring the user to be local to the tank being monitored but instead allowing the user to input information and/or commands, such as the information related to properties of the materials received from an operator in Carsella and Reddy, from a remote location (column 4, lines 20-32 and 49-58).

Response to Arguments

7. Applicant's arguments with respect to claims 17-20, 25, 31, 34, 37, 39, and 43-45 have been considered but are moot in view of the new ground(s) of rejection.

The following arguments, however, are noted:

Applicant argues:

> Independent claim 17 includes estimating a fiducial pulse amplitude related to a reflected wave pulse from an interface between the antenna and the first material and estimating a first pulse amplitude related to a reflected wave pulse from a first material interface between the first material and a second material. It is believed that the cited references do not show the claimed estimation. Further, independent claim 17 includes setting a fiducial threshold value based upon the estimated fiducial pulse amplitude and setting a first threshold value based upon the estimated first pulse amplitude. It is believed that this also is not shown by the cited references. Therefore, the rejections may be withdrawn.

The Examiner maintains that, consistent with the explanation of estimating a pulse amplitude as disclosed in the instant specification, Reddy discloses a method for use by a level transmitter to detect a reflected pulse of a transmitted pulse (column 1, lines 45-54) from a first material interface (column 3, lines 52-56), the method comprising calculating estimated reflection pulses as a function of a reference amplitude of the transmitted microwave pulse and the amplitude of the reflected pulse amplitude and setting a corresponding threshold values based on the estimated reflected pulse amplitude (column 1, line 64 to column 2, line 2 and column 9, lines 6-20) and detecting the reflected pulse from the first material interface using the threshold (column 1, lines 51-54), wherein the threshold calculation is performed using a microprocessor system (column 3, line 66 to column 4, line 6, column 5, lines 21-23, and column 9, lines 6-20).

Further, since the invention of Carsella specifically discloses employing thresholds for detecting reflections at the first, second, and fiducial interfaces (McEwan; column 8, line 66 to column 9, line 3) and Reddy suggests employing thresholds specifically adapted to the particular conditions being measured, as described above in accordance with pulse amplitude estimation, the combination would have employed a specific threshold for detecting each of the reflections at the first, second, and fiducial interfaces.

Applicant then argues:

> Further, Applicant notes that the dependent claims include many additional elements which are not shown or suggested by the references when read in

context with the claims from which they depend. For example, the dependent claims include the use of attenuation and range factors, the calculation of a dielectric parameter (claim 20), and the use of temperature in setting the threshold value (claim 45). Further, the dielectric constants are received from an operator or from the process control loop (claims 43 and 44).

The Examiner asserts that Applicant has not specifically provided an indication as to the errors in the applied art rejections, and therefore the Examiner maintains that the rejections are proper.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent No. 5,943,908 to Innes et al. teaches a probe for sensing a fluid level comprising means for performing time-domain reflectometery (column 3, lines 26-31) by setting a dielectric of a first material and a second material, below the first material, forming a gas/liquid or liquid/liquid interface (column 3, lines 32-52), and using these known dielectric parameters in calculating the detected pulse amplitude to account for pulse amplitude variations (column 3, lines 55-62).

U.S. Patent No. 5,457,990 to Oswald et al. discloses a method for use by a level transmitter to detect a reflection of a transmitted pulse from a first material interface, the method comprising calculating an estimated first reflected pulse amplitude as a function of a reference amplitude of the transmitted pulse (column 9, lines 31-53 and column 10, lines 49-53) and detecting the reflected pulse from the first material

interface using the estimated first reflected pulse amplitude by calculating a first threshold value as a function of the estimated first reflected pulse amplitude (column 10, lines 53-58) using a transceiver apparatus for transmitting a pulse having a transmit amplitude and receiving the pulses to produce a signal representing the reflected wave pulses as part of a controlling processor system (column 7, lines 16-30 and Figures 5, 9, and 10).

Oswald discloses a level calculation module executable by the processor system that establishes a level of the first material interface using the signal and the threshold value (column 4, lines 43-56 and column 8, lines 57-47) and outputs this level through a port to a display means (column 7, lines 28-30).

Oswald discloses detecting multiple pulses (column 6, lines 54-58) wherein a first reflected pulse corresponds to the portion of a transmitted pulse reflected at a first material interface between air and a first product (i.e. first and second materials), a second reflected pulse corresponding to the portion of a transmitted pulse reflected at a first material interface between the first product and a second product (i.e. second and third materials), and a fiducial pulse corresponding to the portion of a transmitted pulse reflected at the fiducial interface at the top of the tank (column 4, lines 12-16 and column 7, lines 7-9).

U.S. Patent No. 5,969,666 to Burger et al. teaches a radar-based method of measuring the level of a material in a containing comprising a transmitter antenna that generates microwave pulses (column 2, lines 3-23).

U.S. Patent No. 6,111,547 to Gau et al. teaches a modularized multiple-feed electromagnetic signal receiving apparatus including means for microwave signals to be converted to an intermediate frequency suitable for propagation in transmission cables.

U.S. Patent No. 5,438,867 to van der Pol teaches a process for measuring the level of fluid in a tank according to the radar principle.

http://hyperphysics.phy-astr.gsu.edu/hbase/ems2.html, "Electromagnetic Spectrum" teaches that microwaves are in the range of 1.6-30 GHz.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jeffrey R. West
Examiner – 2857

August 19, 2006

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